

We claim:

1 1. A machine-readable medium that provides instructions, which when executed by a set  
2 of processors, cause said set of processors to perform operations comprising:  
3 provisioning a non-BLSR protected layer 2/3 channel over a BLSR;  
4 provisioning a tunnel over the BLSR; and  
5 protecting the non-BLSR protected layer 2/3 channel between a first and second node  
6 of the BLSR with the tunnel.

1 2. The machine-readable medium of claim 1 wherein the tunnel is a multi-protocol label  
2 switching (MPLS) tunnel.

1 3. The machine-readable medium of claim 1 further comprising provisioning a second  
2 tunnel on the BLSR, the second tunnel to protect the non-BLSR protected layer 2/3 channel  
3 between the first node and a second node of the BLSR.

1 4. The machine-readable medium of claim 1 further comprising provisioning a second  
2 tunnel on the BLSR, the second tunnel to protect the non-BLSR protected layer 2/3 channel  
3 between a third node and a fourth node of the BLSR.

1 5. A machine-readable medium that provides instructions, which when executed by a set  
2 of processors, cause said set of processors to perform operations comprising:  
3 inhibiting automatic protection switching on a set of physical channels, the set of  
4 physical channels corresponding to a first fiber;  
5 creating a logical working interface and associating the logical working interface to a  
6 first physical port, the physical port connecting to the first fiber;  
7 creating a logical protecting interface and associating the logical protecting interface  
8 to a second physical port, the second physical port connecting to a second  
9 fiber;

associating the logical working and logical protecting interfaces to a forwarding interface, the forwarding interface corresponding to a node;

setting the forwarding interface to refer to the logical working interface while the fiber is not failing; and

modifying the forwarding interface to refer to the logical protecting interface while the fiber is failing.

6. The machine-readable medium of claim 5 wherein the logical protecting interface corresponds to a pre-provisioned tunnel.

7. The machine-readable medium of claim 5 wherein the logical protecting interface corresponds to an MPLS tunnel.

8. The machine-readable medium of claim 5 further comprising establishing a tunnel over a second fiber, the logical protecting interface being associated to the tunnel.

9. The machine-readable medium of claim 5 further comprising:  
detecting failure of the first fiber; and  
transmitting a message on the second fiber to a set of intermediate nodes, the message  
indicating failure of the first fiber.

10. The machine-readable medium of claim 5 further comprising:  
transmitting a first set of layer 2/3 traffic in the second physical port while the first  
fiber is not failing; and  
multiplexing the first set of layer 2/3 traffic with a second set of layer 2/3 traffic for  
transmission in the second physical port while the first fiber is failing, the  
second set of layer 2/3 traffic being transmitted in the first physical port while  
the first fiber is not failing.

11. A machine-readable medium that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

inhibiting automatic protection switching on a set of physical channels, the set of physical channels corresponding to a first fiber;  
creating a logical working interface and associating the logical working interface to a first physical port, the physical port corresponding to the first fiber;  
creating a logical protecting interface and associating the logical protecting interface to a tunnel, the tunnel corresponding to a second fiber;  
associating the logical working and logical protecting interfaces to a forwarding interface, the forwarding interface corresponding to a node;  
setting the forwarding interface to refer to the logical working interface while the fiber is not failing; and  
modifying the forwarding interface to refer to the logical protecting interface while the fiber is failing.

12. The machine-readable medium of claim 11 wherein the tunnel is pre-provisioned over the second fiber.

13. The machine-readable medium of claim 11 wherein the tunnel is an MPLS tunnel over the second fiber.

14. The machine-readable medium of claim 11 further comprising:  
detecting failure of the first fiber; and  
transmitting a message on the second fiber to a set of intermediate nodes, the message indicating failure of the first fiber.

15. The machine-readable medium of claim 11 further comprising:  
transmitting a first set of layer 2/3 traffic in the tunnel while the first fiber is not failing; and  
multiplexing the first set of layer 2/3 traffic with a second set of layer 2/3 traffic for transmission in the tunnel while the first fiber is failing, the second set of layer 2/3 traffic being transmitted in the first physical port while the first fiber is not failing.



1 18. The network element of claim 16 further comprising a tunnel to carry the set of layer  
2 2/3 traffic in the second set of physical channels while the first fiber is failing.

1 19. The network element of claim 16 further comprising an MPLS tunnel to carry the set  
2 of layer 2/3 traffic in the second set of physical channels while the first fiber is failing.

1 20. The network element of claim 16 wherein the ingress layer 2/3 processing circuitry  
2 includes:

- 3 a forwarding interface to forward traffic to the first network element;
- 4 a working interface coupled to the forwarding interface, the working interface to refer
- 5 to the first physical port; and
- 6 a protecting interface coupled to the forwarding interface, the protecting interface to
- 7 refer to the second physical port.

1 21. An apparatus comprising:

- 2 a first fiber connecting the network element to a second network element;
- 3 a second fiber connecting the network element to a third network element;
- 4 a first optical processing circuitry coupled to the first fiber, the optical processing
- 5 circuitry to transmit a first set of optical traffic in a first set of physical
- 6 channels over the first fiber;
- 7 a first egress layer 2/3 processing circuitry coupled to the first optical processing
- 8 circuitry, the first egress layer 2/3 processing circuitry to transmit a set of layer
- 9 2/3 traffic to the first optical processing circuitry while the first fiber is not
- 10 failing, the set of layer 2/3 traffic to be inserted into the first set of optical
- 11 traffic;
- 12 a second optical processing circuitry coupled to the second fiber, the second optical
- 13 processing circuitry to transmit a second set of optical traffic in a second set of
- 14 physical channels over the second fiber;
- 15 a second egress layer 2/3 processing circuitry coupled to the second optical processing
- 16 circuitry, the second egress layer 2/3 processing circuitry to tunnel the set of
- 17 layer 2/3 traffic and to pass the set of layer 2/3 traffic to the second optical

18 processing circuitry while the first fiber is failing, the set of layer 2/3 traffic to  
 19 be inserted in to the second set of optical traffic;  
 20 an ingress layer 2/3 processing circuitry coupled to the first and second egress layer  
 21 2/3 processing circuitry, the ingress layer 2/3 processing circuitry to receive  
 22 and transmit the set of layer 2/3 traffic; and  
 23 a control card coupled to the first and second optical processing circuitry and the  
 24 ingress layer 2/3 processing circuitry, the control card to detect failure of the  
 25 first fiber, to indicate failure of the first fiber to the ingress layer 2/3  
 26 processing circuitry, and to mask the first and second set of physical channels  
 27 from automatic protection switching.

1 22. The network element of claim 21 wherein the set of layer 2/3 traffic is multiplexed  
 2 with a second set of layer 2/3 traffic on the second egress layer 2/3 processing circuitry.

1 23. The network element of claim 21 wherein the tunnel of the set of layer 2/3 traffic is  
 2 with MPLS.

1 24. The network element of claim 21 wherein the ingress layer 2/3 processing circuitry  
 2 includes:

3 a forwarding interface to forward traffic to the first network element;  
 4 a working interface coupled to the forwarding interface, the working interface to refer  
 5 to the first physical port; and  
 6 a protecting interface coupled to the forwarding interface, the protecting interface to  
 7 refer to the second physical port.

1 25. A computer implemented method comprising:  
 2 provisioning a non-BLSR protected layer 2/3 channel over a BLSR;  
 3 provisioning a tunnel over the BLSR; and  
 4 protecting the non-BLSR protected layer 2/3 channel between a first and second node  
 5 of the BLSR with the tunnel.







